

Department of Entomology

College of Food, Agricultural and Natural Resource Sciences

Newsletter 2011



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Letter from Department Head

Bill Hutchison



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After another busy year in Hodson Hall, this mid-December day with an unusually warm 45F southern breeze, it's a good day to reflect on many activities and changes in 2011. The year began with the first ever Insect Calendar created by the Graduate Student club, *Frenatae*. This was well received by many – in part because nearly all of the artwork was conducted by our Graduate

students, with **Dr. Ralph Holzenthal** assisting via his popular *Scientific Illustration* course. By popular demand the calendar is back for 2012 (ordering information enclosed). We entered spring with the Department hosting the Entomological Society of America's NCB meeting at the University of Minnesota, Minneapolis campus in March. More than 20 faculty, staff and students volunteered to assist with the local arrangements, and their effort is truly appreciated. We heard many positive comments about the meeting. With ~350 members strong, this was one of the best attended meetings in recent memory.

This past year was also significant for Faculty awards. Several faculty were recognized for their excellence in a variety of research, extension and teaching activities, including: **Dr. Brian Aukema**, McKnight Land Grant Professor, 2011-2013 (1 of 5 university-wide); **Dr. Ken Ostlie**, Distinguished UofM Extension Award for Campus Faculty; **Dr. Ralph Holzenthal**, UofM Outstanding Contributions to Graduate & Professional Education; and **Dr. Roger Moon**, CFANS Award for Excellence in Graduate Teaching and the NCB-ESA Teaching Award. All are very deserving and we are proud of their achievements. In addition, **Dr. Marla Spivak** continued to receive several unique opportunities to share the fascination of honey bees, bumblebees (and colony collapse disorder) with a variety of new audiences including the readers of *Oprah magazine* and the UofM's new President, **Dr. Eric Kaler**, during inauguration week and his visit to the St. Paul campus.

In addition to faculty awards, our **Graduate Students** also had another excellent year of achievement and dare I say it, excitement! The year began with **Dr. George Heimpel** (DGS) hosting a prospective student tour in March. Following their visit, 11 new Graduate students were accepted. Combined with the 13 new students in 2010, we now have an excellent student body of 35, with several additional students affiliated with the EEB (Ecology and Evolutionary Biology) program. As in past

years, many of our students participated in national and regional ESA meetings, winning several awards for speaking and poster presentations. Among these awards, an EPA-Star Fellowship was awarded to **Judy Wu**, and a new 2-year NSF-funded, IGERT (Invasive Species and Genotypes) Fellowship to **Andrea Hefty** (see pg. 5).

Our **Alumni and Friends** of the Department continue to be very supportive. **Dr. Sping Lin** provided another generous gift in honor of his late wife, **Ying-Ngoh T. Lin**. This new gift will strengthen the existing Sping Lin Fellowship fund for Graduate Students, and also create the new "*Richards-Hodson Lectureship in Insect Physiology and Ecology*." This fall, the 2nd year of the **MGK PhD Fellowship** was awarded to 1st year PhD student, **Leslie Tylczak**, and we received a *Dean's Graduate Fellowship* via CFANS (College of Food & Agricultural & Natural Resource Sciences), from **Dean Al Levine**, to support 1st year PhD student, **Grace (Yang) Li**.

On a more challenging note, our long-time friend and Emeritus Faculty member, **Dr. Ted Radcliffe** suffered a stroke in July. Many friends and alumni responded with cards, letters, and personal visits! One of Ted's gifts from the Department was a "Nerf-gopher football," that was safer to throw at the TV when the football team struggled (again) this year - safer than what he used to throw. As you might guess, this has been a major year of transition for both Ted and his wife Betty, as they adjust to a new schedule of physical therapy and a bit slower travel (see pg. 17). Ted has improved quite a bit, and was able to attend our Fall Welcome party and several Dept. Seminars this year.

As in recent years, the Department and CFANS continue to face many budgetary challenges in the near-term. Until the Minnesota economy improves, as well as national support to federal funding agencies, it will be a challenge to continue to grow departments. As part of this "new normal," and because of the ongoing insect pest management needs in agriculture, the Minnesota Soybean Growers, in partnership with Minnesota Extension and CFANS, agreed to support a new Extension Entomology Faculty position. We are pleased to report that the Search process is underway. We anticipate having the new faculty member, based on the St. Paul campus, on board by late summer/early fall, 2012.

Last but not least, I want to acknowledge and thank our Entomology Office Staff, who keep many spinning plates moving forward. This past year was one of transition with Janet Moe's departure. **Felicia Horan** continues to serve as our Administrator, while our new hire **Tomi Olayiwola**, began working with us in 2011. Tomi filled a new position that serves both Entomology and Fisheries/Wildlife. Please stop by to see us when you are in town, or can stop by at the next ESA Mixer! Best wishes for the New Year!



Distinguished Teaching Award, U of M (2011)

[Ralph W. Holzenthal](#)

"I consider myself a 'hands on' adviser, mainly because of my genuine interest in the student's research, but I hope with enough 'hands off' to give students the freedom to follow their own course."

Insects are a source of enduring fascination to Ralph Holzenthal, a world authority on caddisflies, a group whose well-being is used to gauge the health of streams. He infuses his excitement into graduate students in every subject he touches--for example, the study of how insects are classified based on their evolutionary history. Holzenthal takes students on field trips to places like Central and South America and weaves the latest discoveries in molecular biology into the saga of how insects evolved. He has trained many students and professionals from Latin America and Africa, generating new waves of entomologists to keep alive the study of insects in those areas.

He even turns students who think they have no artistic talent into illustrators of insects, skilled in both pen-and-ink and computer-aided renditions. "... [H]e breaks myths that some materials are only comprehensible to privileged minds," says a former graduate student from Mexico.

Among his many contributions is a complete overhaul of the graduate student manual while he served as his department's director of graduate studies. But the true depth of his impact may be summed up by a former graduate student from Colombia: "One of the most important lessons I have learned from Dr. Holzenthal [is that] the forest crisis of illegal cropping, deforestation and pollution can only be stopped, and sustainable management of the aquatic ecosystems be achieved, when the spirituality and peace of communities living with nature are involved and respected."



ESA North Central Branch Distinguished Achievement Award in Teaching (2011)

CFANS Teaching Award - Graduate Education (2011)

[Roger D. Moon](#)

Roger Moon, Professor, earned his Ph.D. in Entomology from UC-Davis in 1979, and was hired to fill a new position in veterinary entomology at the U of M in 1980. His research interests include the biology, ecology, and management of muscoid flies, mosquitoes, lice, true bugs, and mites associated with animals and humans. He has advised 12 students to M.S. and Ph.D. degrees, and published more than 130 articles, reviews, and book chapters for scientists and the general public. Dr. Moon's teaching program serves undergraduate, graduate, and professional students at the University of Minnesota.

In the 1980s, he developed Veterinary Entomology, a course for undergraduate students in the College of Food, Agriculture, and Natural Resource Sciences. He also has co-taught Insect Population Dynamics and Applied Experimental Design, two graduate-level courses. Dr. Moon coordinates Scientific Communication and Ethics, a team-taught. He also contributes 2-3 weeks of lectures in Medical Entomology and in Veterinary Parasitology, a course in the College of Veterinary Medicine. Annual enrollment in these five courses regularly exceeds 150 students per year.

Roger is a strong proponent of student-centered learning, and relies on active and collaborative learning techniques to augment traditional teaching methods. He developed and uses group testing (and teaching) instead of anxiety-producing individual exams for students in Veterinary Entomology. He also employs active learning exercises in his graduate-level courses, and integrative semester-long projects in all classes. Earlier, while Moon was Director of Graduate Studies, he led a revision of degree program requirements for M.S. and Ph.D. students, and implemented innovative written preliminary exams to nurture student analytical and writing skills.

Honors & Awards - Faculty & Alumni



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Distinguished Campus-based Faculty, U of M Extension (2011)



Kenneth Ostlie Extension Entomologist

Ostlie delivers relevant and timely Integrated Pest Management solutions to corn and soybean growers, crop consultants and the affiliated agribusiness industry. His research on the European corn borer, corn rootworm and soybean aphids are used by industry professionals and producers to reduce and eliminate outbreaks, saving millions of dollars annually.

McKnight Land-Grant Professor (2011 - 2013)



Brian Aukema *Forest Insect Ecology: Small Insects and Big Problems*

Brian Aukema's expertise in population and landscape ecology, and biostatistics, allows him to tackle complex ecological problems concerning insect pests and forest health. His research has contributed to an expanded understanding of a particular species of bark beetle and of Warren root weevil. He is at the forefront of predicting how weather and climate change impact forest insects.



Dr. Subi Bhadriraju Receives Endowed Professorship

University of Minnesota alumnus and Kansas State University professor of grain science, **Subramanyam "Subi" Bhadriraju**, has been appointed the first Donald A. Wilbur Endowed Professor in Stored-Product Protection at K-State. Bhadriraju will begin the three-year appointment on Jan. 1, 2012.

For more information, see full article at <http://www.entomology.umn.edu/AlumniFriends/index.htm>.

Recent Graduates (2010-2011)

2010 - Morey, Amy. (M.S.) Corn earworm (*Helicoverpa zea* Boddie), cold hardiness, and climate change: Implications for future distributions and IPM. Advisor: **Hutchison, William D.**

2010 - Robertson-Thompson, Desiree R. (Ph.D.) Systematic studies of the caddisfly subfamily Protoptilinae (Trichoptera: Glossosomatidae). Advisor: **Holzenthal, Ralph W.**

2010 - Chacon, Jeremy M. (Ph.D.) Intraguild predator interference of a classical biological control agent of the soybean aphid. Advisor: **Heimpel, George E.**

2011 - Dieckhoff, Christine. (Ph.D.) Host acceptance behavior in the soybean aphid parasitoid *Binodoxys communis* (Hymenoptera: Braconidae) - The role of physiological state in biological control. Advisor: **Heimpel, George E.**

2011 - Koch, Karrie A. (Ph.D.) The Role of Entomopathogenic Fungi in the Management of Soybean Aphid. Advisor: **Ragsdale, David W.**

2011 - Puhl, Joshua G. (Ph.D.) Locomotion and its activation by dopamine in a simpler neural network. Advisor: **Mesce, Karen A.**

Honors & Awards - Graduate Students



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Awards & Honors during the past year:

Alyssa Anderson - 2011: Graduate School Research Extension award; P.E.O. Scholar Award, International Chapter, P.E.O. Sisterhood; Torske Klubben Graduate Fellowship for Minnesota Residents; The Norwegian Marshall Fund Award, Norway-America Association.



Lindsey Christianson - 2011: 1st Place, M.S. Student Poster Competition, National ESA Meeting, Reno, NV.

Heather Cummins - 2011: 2nd place, M.S. Student Poster Competition, NCB-ESA Meeting, Minneapolis, MN; Dayton Bell Museum Fund Fellowship.



Trisha Franz - 2011: Minnesota Corn Research and Promotion Counsel Grant.



Michael Goblirsch - 2011: California State Beekeepers Association Research grant; Sigma Xi Grants-in-Aid of Research.

Anthony Hanson - 2011: 1st Place, M.S. Student Poster Competition, NCB-ESA meeting, Minneapolis, MN



Thelma Heidel - 2011: Midwest Organic & Sustainable Education Service (MOSES) Student Scholarship; CFANS Graduate Student Scholarship; CERES Trust Graduate Student Research Initiative Grant.

Karrie Koch - 2010: President's Prize (1st place): 10-minute paper presentation (student competition), National ESA meeting, San Diego, CA.



Petra Kranzfelder - 2011: GAPSA Travel Grant.

Laura Machial (Univ. of No BC; Advisor: Brian Aukema) - **2011:** 2nd place, M.S. Poster Competition, NCB-ESA Meeting, Minneapolis, MN.

Fraser McKee - 2011: 3rd place, Ph.D. Student Paper Competition, NCB-ESA Meeting, Minneapolis, MN.



Corey McQueen - 2011: 2nd place, Ph.D. Student 10-Minute talk, National ESA Meeting, Reno, NV.

Amy Morey - 2011: Marion-Brooks Wallace \$4500 Grant Proposal, Dept. of Entomology; 2nd place, Ph.D. Student Poster Competition, National ESA Meeting, Reno, NV.



Robin Thomson - 2011: Dayton-Wilkie Natural history Fellowship, Bell Museum of Natural History; CIC/Smithsonian Pre-Doctoral Research Fellowship.



Judy Wu - 2011: California State Beekeepers Association Research Grant.

Multiple Year Fellowships

Andrea Hefty - 2011-2013: Two-year IGERT Fellowship, University of Minnesota.

Thelma Heidel - 2010 - 2012: Two-year IGERT Fellowship, University of Minnesota; Three Year Graduate School, University of Minnesota.

Joseph Kaser - 2010 - 2012: Two-year IGERT Fellowship, University of Minnesota.



Amy Morey - 2010 - 2012: Two-year IGERT Fellowship, University of Minnesota.

Judy Wu - 2011-2014: EPA STAR Fellowship, U.S. EPA.

Fellowships & Scholarships Awarded to incoming students

Lesley Tylczak – MGK[®] Fellowship
Yang (Grace) Li - CFANS Fellowship for Excellence in Entomology - Dean Al Levine

2011 Hodson Graduate Alumni Award Recipient

Dr. Dale Clayton



Dr. Dale Clayton is currently a Professor in the Department of Biology at the University of Utah. He is also Adjunct Curator, Utah Museum of Natural History, and Co-founder & Chief Scientific Officer, Larada Sciences Inc., UT.

In addition to his many research accomplishments, Dale fostered a unique and practical outcome of his research on human lice. In 2004, with funding from the Utah Centers of Excellence program, Dale established the Center for Alternate Strategies of Parasite Removal (CASPeR). The sole purpose of the center was to develop a device capable of controlling head lice with carefully controlled and directed warm air. This machine, named the “LouseBuster” has proven to be a major success. It is currently being marketed by Larada Sciences Inc., a University of Utah spinoff company based in Salt Lake City. This work was published in the journal *Pediatrics* in 2006 and generated worldwide attention (especially from school kids and teachers).

Dr. Clayton received his B.A. in Biology, Hartwick College (NY), his M.S. in Entomology, Univ. of Minnesota (1983) with Dr. Roger Price (Professor Emeritus), and his Ph.D. in Evolutionary Biology, Univ. of Chicago in 1989. Dale received a prestigious NSF-NATO postdoctoral fellowship and has won numerous awards since, including the Henry Baldwin Ward Medal (Am. Soc. of Parasitologists) and Fellow of the Am. Ornithologists’ Union. In brief, Dale is a world authority on the systematics of bird (chewing) lice, and reciprocal effects of hosts and parasites on one another in both ecological and evolutionary time; he is currently summarizing his life’s work (to date) in a book entitled: “The Ecological Basis of Co-evolutionary History: Lessons from Lice.”

Dale has published over 100 peer reviewed articles in over 40 different journals, including PNAS, Proc. Royal Soc., PLoS, with two papers featured in *Science*. He has mentored 12 Graduate students and 6 postdocs and numerous undergraduate students, in addition to his formal teaching responsibilities. Much of his funding is from NSF, with grants totaling over \$2.6 million.

Dale gave one of the most fascinating seminars since the inception of the Hodson Award. The Department also acknowledges the hospitality of **Drs. Susan Weller** and **Bob Zink** for hosting a grand reception for Dale during his visit.

Selected Publications

- Johnson, K. P., J. Weckstein, M. Meyer and D.H. Clayton. 2011.** There and back again: Switching between host orders by avian body lice (Ischnocera: Gonioididae). *Biological Journal of the Linnean Society* 102: 614-625.
- Malenke, J. R., N. Newbold and D.H. Clayton. 2011.** Condition-specific competition governs the geographic distribution and diversity of ectoparasites. *American Naturalist* 177: 522-534.
- Bush, S. E., A. N. Rock, S.L. Jones, J.R. Malenke, and D.H. Clayton. 2011** Efficacy of the LouseBuster, a new medical device for treating head lice (Anoplura: Pediculidae). *J. of Med. Entomol.* 48:67-72.
- Owen, J. P., A. C. Nelson, D.H. Clayton. 2010.** Ecological immunology of bird-ectoparasite systems. *Trends in Parasitology.* 26(11):530-9.
- Johnson, K. P. D. H. Clayton, J. P. Dumbacher, R.C. Fleischer. 2010.** The flight of the Passenger Pigeon: Phylogenetics and biogeographic history of an extinct species. *Molecular Phylogenetic Evolution.* 57(1):455-



Call for Nominations 2012

The Department of Entomology, College of Food, Agricultural and Natural Resource Sciences at the University of Minnesota is proud to announce a call for nominations for the 2012 Hodson Graduate Alumni Award. The Award, named in honor of Dr. Alexander Hodson, Department Head from 1960-1974, is intended to annually recognize and honor an outstanding alumna or alumnus of the Department of Entomology. The Award will be presented during the Department's Honors Day which also pays tribute to the achievements of students in the Entomology Graduate Program.

Nominations are invited based on the following:

- ❖ One awardee will be chosen annually in March and invited to participate in the Department's Honors Day. The award includes travel to St. Paul and related expenses.
- ❖ Nominees must have received a graduate degree in an entomological program from the University of Minnesota. The degree must have been granted at least five years before nomination.
- ❖ Nominees must have demonstrated distinguished accomplishment and leadership in entomology through research, writing, teaching, extension or administration, and related career activities.
- ❖ Nominations consist of a letter highlighting the nominee's accomplishments, a current curriculum vitae, and three letters of support. Only one nomination from the same source will be accepted in a given year.
- ❖ The awardee must be willing to present a seminar during the Department's Honors Day in May.
- ❖ The award will not be bestowed on the same person more than once in ten years.

Nominations will be accepted at any time, but must be received by 15 February to be considered for the current year's award.

Nominations not previously selected will be held for 2 years (these may be updated by the deadline).

The awardee will be selected by the Awards Committee of the Department of Entomology.

**To be eligible for the 2012 Award, nominations must be received by
15 February, 2012. The Award will be presented at a
Department Honors Day in May 2012.**

Nominations should be sent to:

**William D. Hutchison, Professor and Head
Dept. of Entomology
University of Minnesota
1980 Folwell Ave, Rm 219
St. Paul, MN 55108
Email: hutch002@umn.edu**



- Andow, D. A. 2011.** Assessing unintended effects of GM plants on biological species. *Journal für Verbraucherschutz und Lebensmittelsicherheit* 6(S1): S119.
- Andow, D. A., S. L. Farrell, and Y. Hu. 2010.** Planting patterns of in-field refuges observed for Bt maize in Minnesota. *J. of Econ. Entomol.* 103 (4): 1394.
- Asplen, M. K., K. A. G. Wyckhuys, and G. E. Heimpel. 2011.** Parasitism of autumnal morphs of the soybean aphid, *Aphis glycines* (Hemiptera: Aphididae), by *Binodoxys communis* (Hymenoptera: Braconidae) on buckthorn. *Annals of the Entomol. Soc. of Am.* 104:935.
- Aukema, B.H. and Y. Zheng. 2010.** Hierarchical dynamic modeling of outbreaks of mountain pine beetle using partial differential equations. *Environmetrics* 21: 801.
- Aukema, B H., J. Zhu, J. Møller, J.G. Rasmussen, and K. Raffa. 2010.** Predisposition to bark beetle attack by root herbivores and associated pathogens: Roles in forest decline, gap formation, and persistence of endemic bark beetle populations. *Forest Ecology and Management* 259 (3): 374.
- Baldrige, G. D., N. Y. Burkhardt, M. B. Labruna, R. C. Pacheco, C. D. Paddock, P. C. Williamson, P. M. Billingsley, R. F. Felsheim, T. J. Kurtti, and U. G. Munderloh. 2010.** Wide dispersal and possible multiple origins of low-copy-number plasmids in *Rickettsia* species associated with blood-feeding arthropods. *Appl. Environ. Microbiol.* 76:1718.
- Baldrige, G. D., N. Y. Burkhardt, A. S. Oliva, T. J. Kurtti, and U. G. Munderloh. 2010.** Rickettsial *ompB* promoter regulated expression of GFPuv in transformed *Rickettsia montanensis*. *PLoS ONE* 5:e8965.
- Bartel, R.A., K. S. Oberhauser, J. C. de Roode, and S. M. Altizer. 2011.** Monarch butterfly migration and parasite transmission in eastern North America. *Ecology* 92:342.
- Blahnik, R. J., and R. W. Holzenthal. 2010.** Systematics of the Neotropical caddisfly genus *Notidobiella* Schmid (Trichoptera, Sericostomatidae), with the description of 3 new species. *Zookeys* 71: 23.
- Boone, C.K., Aukema, B.H., Bohlmann, J., Carroll, A.L., and K.F. Raffa. 2011.** Efficacy of plant defenses varies with herbivore population density: a basis for positive feedback in eruptive species. *Canadian Journal of Forest Research* 41: 1174.
- Burkness, E.C., G. Dively, T. Patton, A.C. Morey & W.D. Hutchison. 2010.** Novel Vip3A *Bacillus thuringiensis* (Bt) maize approaches high-dose efficacy against *Helicoverpa zea* (Lepidoptera: Noctuidae) under field conditions: Implications for resistance management. *GM Crops*. 1(5): 337.
- Burkness, E. C., P. K. O'Rourke, and W. D. Hutchison 2011.** Cross-pollination of nontransgenic corn ears with transgenic Bt corn: Efficacy against Lepidopteran pests and implications for resistance management. *Journal of Econ. Entomol.* 104 (5): 1476.
- Chacón, J. M., and G. E. Heimpel. 2010.** Density-dependent intraguild predation of an aphid parasitoid. *Oecologia* 164:213.
- Chamorro-Lacayo, M. L. and R. W. Holzenthal. 2011.** Phylogeny of Polycentropodidae Ulmer, 1903 (Trichoptera: Annulipalpia: Psychomyioidea) inferred from larval, pupal and adult characters. *Invertebrate Systematics* 25 (3): 219.
- Cho, S., Zwick, A., Regier, J., Mitter, C., Cummings, M., Yao, J., Du Z., Zhao H., Kawahara, A., Weller, S., et.al. 2011.** Deliberately Unequal Gene Sampling: Boon or Bane for Phylogenetics of Lepidoptera (Hexapoda)? *Systematic Biology* 60: 782-796.
- Crane, D. M., and R. D. Moon. 2010.** Checklist of mosquitoes in Savanna Portage State Park, north-central Minnesota. *Journal of the American Mosquito Control Association* 26:324.
- De la Giroday, H.-M., Carroll, A.L., Lindgren, B.S., and B.H. Aukema. 2011.** Incoming! Association of landscape features with dispersing mountain pine beetle populations during a range expansion event in western Canada. *Landscape Ecol.* 26: 1097.
- Dieckhoff, C., and G. E. Heimpel. 2010.** Determinants of egg load in the soybean aphid parasitoid *Binodoxys communis*. *Entomol. Exp. Appl.* 136:254.
- Drew, J., N. Anderson, and D. Andow. 2010.** Conundrums of a complex vector for invasive species control: a detailed examination of the horticultural industry. *Biol. Invasions* 12 (8): 2837.
- Duh, D., V. Punda-Polic, T. Avsic-Zupanc, D. Bouyer, D. H. Walker, V. L. Popov, M. Jelovsek, M. Gracner, T. Trilar, N. Bradaric, T. J. Kurtti, and J. Strus. 2010.** *Rickettsia hoogstraalii* sp. nov., isolated from hard- and soft-bodied ticks. *Int. J. Syst. Evol. Microbiol.* 60:977.
- Eaton, M., and S. A. Kells. 2011.** Freeze mortality characteristics of the mold mite *Tyrophagus putrescentiae*, a significant pest of stored products. *J. of Econ. Entomol.* 104 (4): 1423 -1429.
- Engels, H., D. Bourguet, L. Cagan, B. Manachini, I. Schuphan, T. J. Stodola, A. Micoud, C. Brazier, C. Mottet, and D. A. Andow. 2010.** Evaluating resistance to Bt toxin Cry1Ab by F2 screen in European populations of *Ostrinia Nubilalis* (Lepidoptera: Crambidae). *J. of Econ. Entomol.* 103(5): 1803.
- Fallon, A. M., and A. Gerenday. 2010.** Ecdysone and the cell cycle: investigations in a mosquito cell line. *Journal of Insect Physiology* 56:1396.
- Felsheim, R. F., A. S. Chavez, G. H. Palmer, L. Crosby, A. F. Barbet, T. J. Kurtti, and U. G. Munderloh. 2010.** Transformation of *Anaplasma marginale*. *Vet. Parasitol.* 167:167.
- Ferrington Jr., L C., O. A. Saether. 2011.** A revision of the genera *Pseudosmittia* Edwards, 1932, *Allocladius* Kieffer, 1913, and *Hydrosmittia* gen. n. (Diptera: Chironomidae, Orthocladiinae). *Zootaxa* 2849:1-314.



- Gagnon, A. E., G. E. Heimpel, J. Brodeur. 2011.** The ubiquity of intraguild predation among predatory arthropods. *PLoS ONE* 6(11): e28061
- Gagnon, A. E., J. Doyon, G. E. Heimpel, and J. Brodeur. 2011.** Prey DNA detection success following digestion by intraguild predators: influence of prey and predator species. *Mol. Ecol. Res.* 11 (6): 1022.
- Gerenday, A., and A. M. Fallon. 2011.** Increased levels of the cell cycle inhibitor protein, dacapo, accompany 20-hydroxyecdysone-induced G1 arrest in a mosquito cell line. *Arch. of Insect Biochem. & Physiol.* In press.
- Haight, R. G.; Homans, F. R.; Horie, T., Mehta, S. V., Smith, D. J.; Venette, R. C. 2011.** Assessing the cost of an invasive forest pathogen; A case study with oak wilt. *Environ. Management.* 47: 506.
- Hamilton, A J., Y. Basset, K. K. Benke, P. S. Grimbacher, S. E. Miller, V. Novotny, G. A. Samuelson, N. E. Stork, G. D. Weiblen, and J. D. L. Yen. 2010.** Quantifying uncertainty in estimation of tropical arthropod species richness. *American Naturalist*, The 176 (1): 90.
- Hamilton, S. W., and R. W. Holzenthal. 2011.** Twenty-four new species of *Polycentropus* (Trichoptera, Polycentropodidae) from Brazil. *Zookeys* 76: 1.
- Hastie, K M., C. R. Kimberlin, M. A. Zandonatti, I. J. MacRae, and E. O. Sapphire. 2011.** Structure of the Lassa virus nucleoprotein reveals a dsRNA-specific 3' to 5' exonuclease activity essential for immune suppression. *PNAS* 108 (6): 2396.
- Heidel, T. T. and Morey, A. C. 2011.** First collection records of *Hippodamia variegata* (Coleoptera: Coccinellidae) in Minnesota corn and soybean. *The Great Lakes Entomol.* 44: 83.
- Hellestad, V. J., B. A. Witthuhn, and A. M. Fallon. 2011.** The insect repellent DEET (N,N-diethyl-3-methylbenzamide) increases the synthesis of glutathione S-transferase in cultured mosquito cells. *Cell Biol. and Toxicol.* 27:149.
- Heimpel, G. E. 2011.** Biocontrol Musing: Parasitoids are better taxonomists than entomologists are. *IOBC-NRS Newsletter* (Spring 2011) 33:4.
- Heimpel, G. E. 2011.** Biocontrol musing: Biological control by dragonflies. *IOBC-NRS Newsletter* (Summer 2011) 33: 4
- Heimpel, G. E. 2011.** Biocontrol musing: Oecophylla weaver ants provide multiple benefits to humans. *IOBC-NRS Newsletter* (Fall 2011) 33:4
- Heimpel, G. E., and M. K. Asplen. 2011.** A goldilocks hypothesis for dispersal of biological control agents. *BioControl* 56:441.
- Holzenthal, R. W. and L. E. Rázuri-Gonzales. 2011.** A new species of *Amphoropsyche* (Trichoptera, Leptoceridae) from Ecuador, with a key to the species in the genus. *Zookeys* 111: 59.
- Huang, F., D. A. Andow and L. L. Buschman. 2011.** Success of the high dose/refuge resistance management strategy after fifteen years of Bt crop use in North America. *Entomol. Exp. et Appl.* 140(1): 1.
- Hutchison, W. D., and N. P. Storer. 2010.** Expanded use of pyramided transgenic maize hybrids expressing novel *Bacillus thuringiensis* toxins in the southern US: potential for areawide suppression of *Helicoverpa zea* (Lepidoptera: Noctuidae) in the Mississippi Delta. *The Southwestern Entomol.* 35 (3): 403.
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Bed Bug Hotline

Established in response to the growing need for reliable information on bed bugs, the **bed bug hotline** and resource center was started with a grant from the EPA (Region V) and the Minnesota Department of Agriculture. **Dr. Stephen Kells** secured the grant and hired **Ms. Amelia Shindelar** to act as the Community Health Coordinator. Dr. Kells and Ms. Shindelar have written a variety of factsheets on bed bugs, updated the website (www.bedbugs.umn.edu), hosted a hotline, and begun work on an educational video for the *Karen community of Minnesota*. The video addresses all aspects of bed bug identification and control and will be available in English, Karen and Spanish.



Since the hotline was established and advertised in early October, we have received 170 contacts. The majority of these have been phone calls but also include a number of emails. Questions from callers fall into a number of categories:

- How do I know I have bed bugs?
- I have bed bugs in my home, what should I do?
- I have bed bugs and I can't afford to treat them, what should I do?
- I read on the internet that *<insert the latest rumor>*...is this true?
- I went on a trip and stayed in a place with bed bugs, what should I do?



Dr. Kells has been working on bed bug issues since 2001, when reports of bed bug infestations started increasing. Bed bug infestations have increased due to a number of factors including; increased travel, changing insecticide use, lack of public awareness and insecticide resistance. Bed bugs have received much publicity in the United States over the last couple of years as hotels, retail stores, schools and theaters encounter bed bug infestations.



Bed bugs do not transmit diseases, though they have been classified as a public health pest. People dealing with bed bugs in their homes report

stress, anxiety, insomnia and other ill effects. The CDC recently released a report on over-application of insecticides and the health effects in bed bug situations, including the report of one woman who died after she and her husband applied insecticides in their home and on their own bodies in an attempt to get rid of bed bugs.

New Bed Bug Hotline: 1-855-644-2200

Response to the bed bug hotline has been overwhelmingly positive with callers expressing gratitude for a service which they see as desperately needed. However, there is still much work to be done, particularly when addressing bed bug treatment measures for those who cannot afford proper treatments. There are very frequent requests for assistance of this nature.



Dr. Kells and Ms. Shindelar will be providing in-person trainings starting in December, and have already received a number of requests from a variety of organizations including schools, nursing agencies and casinos.

Frenatae Update



Frenatae, the Entomology Graduate Student Organization is back at work for the 2011-2012 school year. We are excited to be bringing **Alexander Wild** for our departmental seminar series in the spring to give a talk on insect evolution. Alexander Wild is a renowned insect photographer and biologist at the University of Illinois. He also blogs for Scientific American and Myrmecos and has written for BBC, Natural History, New York Times, National Geographic, and many other publications. We are very excited about his visit and look forward to both hearing his talk and seeing his photographs. Frenatae also awarded **Dr. Roger Moon** with their *2011 FAME Award* (Faculty Award for Mentorship in Entomology). Congratulations Roger!



Last year Frenatae was very active in bringing faculty and students together for a lot of fun events. Not content with seeing insects daily, we took a trip to see a circus performance of insect acrobatics at the Cirque du Soleil's insect themed OVO. *Cirque du Soleil's* OVO had buprestids, coccinellids, orthopterans, and we were

probably the only people in the crowd that tried to identify them to species. This year we decided to go easy on the faculty during the student versus faculty softball game by playing kickball instead. The students still won! Congratulations go out to all of our big winners for this year's pumpkin carving contest at the 17th annual Halloween Party at the Honey House. It was, once again, a blast. We continue to have Pig's Eye social events and dodge ball games for anyone looking to have fun outside of class.

Current Frenatae Officers for 2011-12



President: Corey McQueen
Vice President: Chan Heu
Co-Secretaries: Heather Cummins & Jamison Scholer
Treasurer: Jessica Miller
COGS Representatives: Lesley Tylczak & Samuel Fahrner
Faculty Meeting Representative: Anthony Hanson

In order to fund all of our events, Frenatae will be holding another Honey & Candle Sale. However, the lineup has expanded to include student-designed calendars, notecards, and beautiful handmade cochineal dyed scarves. Calendars were sold last year to rave reviews and so we have expanded the artwork to notecards. Both feature insect artwork created by **Dr. Ralph Holzenthal's** Scientific Illustration of Insects class.

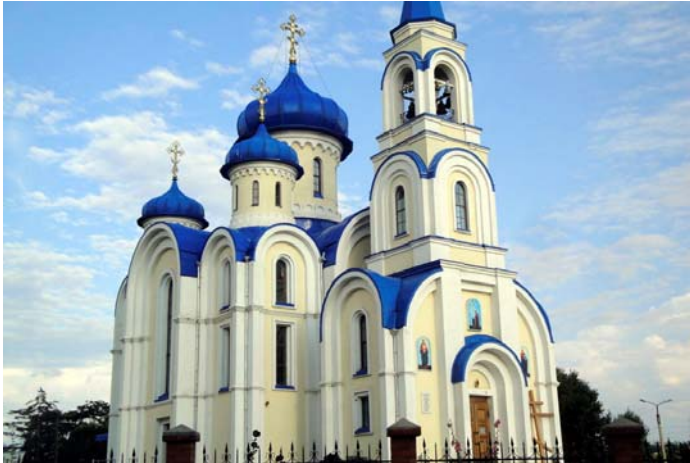
To check out items for sale, visit:

<http://sites.google.com/site/frenataeumn/>



Caddisflies, Tigers, and Jaguars!

Ralph Holzenthal



Last summer and fall I had the opportunity to collect caddisflies in the land of tigers and jaguars. In August, I was invited by my Russian colleague, **Dr. Tatiana Vshivkova** of the Far Eastern Branch of the Russian Academy of Science, in Vladivostok, to collect caddisflies in the Primorsky region of Russia. This is the area just north of Korea and China on the Sea of Japan. Tanya and I are part of a joint US/Russia research project to study the caddisflies of this part of Russia.



We collected in large rivers and small streams, as well as marshes and lakes. The forests of Primorsky have been referred to as the “temperate jungle” because of the diversity of trees and other vegetation. Much of the flora and the insect fauna were familiar to me but very diverse and rich. The insect diversity was almost tropical in nature. The diversity of large saturniid moths was impressive.

We collected about 80 species of caddisflies, maybe 1/3 of the known fauna of the Russian Far East. So far, no new species for science, but many species new for the insect collection not previously represented. The project has funds for more collecting next summer. My experience this summer was incredible, not only were the insects and landscape amazing, but the people were very friendly and accommodating, and the cultural experience was very interesting and rewarding.

In October, I traveled to Ecuador at the invitation of **Dr. Blanca Rios** and **Dr. Andrea Encalada** of the Universidad de San Francisco de Quito. Blanca and Andrea study the ecology of aquatic insects in tropical streams. I spent the first week in Quito giving a mini version of my digital illustration course to about 20 students from the University of San Francisco. After the course was over we travelled to 3 different ecosystems in Ecuador to collect caddisflies. We started at almost 4,000 m elevation in the “páramo” near Quito. The páramo is that part of the Andes above the tree line, equivalent to the alpine zone in North America and Europe. The diversity of plants at this elevation in the Ecuadorian wet páramo was great, and we collected three new species of caddisflies!



After the páramo, we collected at mid-elevation “cloud” forests with our collecting sites ranging from about 2500-1500 m in the Yanayacu and Los Cedros Biological Reserves. We collected in the thick forest at Yanayacu during a fierce electrical storm and did not get much as a result, but what we did collect also included some new species. The weather in Los Cedros was more accommodating and the collecting was worth the 3 hour trek by foot and mule up the mountain.



After the cloud forest we travelled by boat down the Napo and Tiputini Rivers to the Tiputini Biodiversity Station of the University of San Francisco. The station is

in pristine lowland Amazonian rainforest, adjacent to Yasuní National Park, home to jaguars, tapirs, and 9 species of monkeys. You can imagine that the caddisfly fauna from this lowland region was completely different from the páramo and, likewise, the cloud forest. I have never seen so many species of butterflies in one place, much less one puddling site. Of course, like Russia, the people I met were wonderful and the cultural experience was richly rewarding. If you use Facebook, you can see pictures and videos of my trips to Russia and Ecuador posted on my homepage.

Another productive year in the UMSP Insect Collection! Collection Director, **Dr. Ralph Holzenthal** taught, advised students, went on expedition to Eastern Russia, Ecuador, and presented a short (invited) version of his popular "Scientific Illustration" class to participants in Ecuador ([see news information below](#)). 2011 also marked the first complete year of the new curator, **Dr. Paul Tinerella** (settling in nicely!), who began the year with teaching an undergraduate honors course, Spring semester 2011 in the ESPM program: "Environmental Science and Society". Since starting his new position in the UMSP, he has recently brought his water bugs research website back on-line (currently under construction!): <http://nepomorpha.org> and integrated his research program with the UMSP Collection. In addition to curation of the insect collection, two large NSF grants were awarded to the UMSP insect collection, one transferred by Dr. Tinerella and another awarded to Drs. Holzenthal & Tinerella, which will fund complete digitization, integration, and virtual (WWW) accessibility of all UMSP collections data.

As of December 2011, all glass microscope slides (about 500,000) and the antiquated vial card system and vials are digitized. Work is progressing on making the virtual slides and vials with their data, available electronically. In preparation for WWW access to the "virtual collection", the UMSP Insect Museum website is being redesigned and the early version (still under construction!) is available at: <http://insectcollection.org>. Work is now underway to digitize all pinned insect holdings (ca. 6,000 drawers of insects) in the collection. This effort is utilizing high-resolution gigapixel photography of each drawer which will make all 6,000+ drawers of specimens available on-line for 'zoomable' search and discovery. Two current examples can be seen at: <http://gigapan.org/gigapans/90453> and <http://gigapan.org/gigapans/89861> (be sure to click the full-screen viewer button and zoom around in the images).



Ph.D. Student Kit Martin collecting aquatic bugs in Central Minnesota.

The NSF digitization grants awarded to UMSP have facilitated employment of 17 undergraduate and graduate curatorial assistants; all active in digitizing the insect drawers and acquiring data from all collection specimens. In addition, one of the grants has funded a new Ph.D. student in insect taxonomy & biodiversity informatics: **Kit Martin** (Fig. #). Kit is a Humphrey Institute (U of MN) Fellow, and will soon complete his M.S. degree in Urban and Public Planning. He began his doctoral work in the UMSP Insect Museum in the fall of 2011. Kit has an exciting and challenging Ph.D. degree position: he will focus on integrating the physical and virtual UMSP Insect Collection data resulting from the digitization process, and implement innovative ways to integrate and use these data in modern biodiversity studies.

Among curation, digitization, and teaching, Paul made several trips for field work in 2011, including a two week trip to continue biotic inventory research on aquatic bugs in Big Thicket National Preserve, eastern Texas. During that time he taught a field research course for the Eastfield College NSF-STEM Undergraduate Summer Research Scholar program at the Big Thicket Research Station; Saratoga, Texas (Fig. #). He also made a trip out west to Colorado, Wyoming, and South Dakota to collect aquatic true bugs and beetles for continuing biodiversity survey research. Additionally, he and new Ph.D. student Kit Martin made several regional collecting trips for survey and study of aquatic bugs and beetles.



Paul Tinerella and Eastfield College NSF-STEM students in Big Thicket National Preserve



Please visit the new UMSP Insect Museum website (<http://insectcollection.org>) often in the coming months, as this will be a great source to keep up with current events in the UMSP collection, progress with digitization, and the new UMSP "Virtual Insect Museum"!

(Scan and check out the UMSP Virtual Insect Museum!)



By Dr. Mark Ascerno
Emeritus Professor

IPM³ Expands its Courses

The popular and student acclaimed IPM³ Core Concepts Module is now available in Spanish. To see an outline of the module in Spanish, visit <http://www.cce.umn.edu/Integrated-Pest-Management-Education/Modulo-de-Conceptos-Centrales-de-MPI/index.html>.

Spanish-speakers can also receive registration instructions in Spanish at <http://www.cce.umn.edu/Documents/CPE-Conferences/IPM3-Spanish-Instructions.pdf>. Access is also possible at www.umn.edu/ipm3 by clicking on MÓDULO DE CONCEPTOS CENTRALES DE MPI in the left column or Spanish Core Concepts Module in the *At A Glance* section in the right column. Prospective students can now register at the special 33% discounted rate of \$250.

The Spanish-version of the Core Concepts Module will be delivered online and asynchronously. The first session will begin 23 January 2012 and will end 12 March 2012. This allows students to progress at their own pace within the prescribed instructional period. IPM³ is also offering the following courses during this period:

- IPM Core Concepts Module (in English)
- Invasive Species Specialty Module
- Imported Fire Ant IPM
- Pest Biology – Plant Diseases
- Pest Biology – Weeds
- IPM for Facility Managers and Supervisors



The IPM³ Training Consortium is made up of IPM practitioners from land grant institutions and federal agencies.

The University of Minnesota is the lead institution. Visit www.umn.edu/ipm3 for program details, and course/registration information.

Our mission is to provide practical information that helps individuals, agencies and organizations utilize IPM principles in their day-to-day pest management decisions. Our target audience is broad and includes anyone who has an interest in becoming proficient in IPM implementation. Our students are affiliated with local and state government, the private sector, various federal agencies, Master Gardeners from around the US, several international countries, as well as undergrad, grad students and professionals from various universities.



IPM³ training is designed to reflect practical, real world content -- theoretical and academic content are only included to the extent that they are needed to understand the practical training. Modules are the fundamental element of IPM³ training and range from 5-15 hours of student contact time. Continuing Education Units (CEUs) are awarded at the rate of 1.0 CEU for each 10 hours of module content. Lessons use multiple media learning techniques that variously include text, videos, still photo, and case studies. Assessments occur at the conclusion of each lesson – a grade of 80% is required for successful completion.

After five years, of “lab-steading” in the midst of an epidemic of mountain pine beetles in western Canada, having lost most pines, the Aukema lab decided to leave the University of Northern British Columbia and strike east; crossing the Rocky Mountains. Having hardly sufficient room on the wagons for the wonderbox (environmental growth chamber), they bid farewell to postdoc **Dr. Sambaraju**, who traversed northeast to the Laurentian Forest Service; **Ms. de la Giroday**, who sought refuge in administration; and undergraduate Mr. Hopkins, he of ESA undergraduate achievement award fame, who set off for graduate pursuits in Utah. Crossing the prairies, the laboratory caught word of a new ash borer settling into the North Star State. Taking no stock of sound advice, the lab proceeded to settle at the University of Minnesota. The University, pleased with such foolhardiness, awarded to **Dr. Aukema** a McKnight Land-Grant professorship such that the entire lab, also finding the department seminar food of uncommon quality, decided to stay and pursue research on climate change, population dynamics, and invasion

biology of forest insects. In the first year, **Mr. Koopmans**, unraveling the population dynamics of mountain pine beetle, and **Ms. Machial**, expert tracker of Warren root collar weevils, each finished graduate degrees bestowed by the University of Northern British Columbia from whence they came; both obtaining the highest passing grades, including an Academic Distinction as highest-standing MSc student for Mr. Koopmans. Also in the first Minnesota year, **Mr. Teen** continued to write his thesis concerning engraver beetles and pine mortality; **Mr. McKee**, having an affinity for biting flies, began to study depredations of tamarack in the northern bogs; **Mr. Fahrner**, formerly of the UC-Davis, arrived to study impacts of natural enemies and their allies on the emerald ash borer; and **Ms. Hefty**, a local socialite, forged a new collaboration between Drs. Aukema and Venette to study potential loss of black walnut from a menacing twig beetle. An undergraduate, **Ms. Zahradka**, having a father skilled in shooting photographs (below), also took up residence to show good cheer and direct the work.



Back row from L to R: Mr. Ewing Teen, Mr. Samuel Fahrner, Ms. Andrea Hefty
Front row: Ms. Laura Machial, Mr. Fraser McKee, Dr. Brian Aukema, and Ms. Audrey Zahradka.

“It’s Super Cool to Work in the Venette Lab!”

As a research biologist with USDA Forest Service for the past 7 years, I study the ecology of non-native, invasive species that may affect trees or forests. So, I get to work on weeds, pathogens, and insects. The goal of my research is to forecast the distribution or impact of invasive species that are not (yet!) found in eastern North America or have only recently arrived. With this information, we can develop better, proactive pest management plans. An immediate question of local concern is whether new invaders are likely to survive Minnesota winters. I am fortunate to advise four students in Entomology to help answer this and related questions. Many of our studies involve measuring factors that affect the temperature at which insects freeze (aka, the supercooling point) and/or die.

Lindsey Christianson is a first-year Master’s student. As a North Dakota native, Lindsey knows cold! She began working in my laboratory as an undergraduate to study the cold tolerance of the light brown apple moth (LBAM; *Epiphyas postvittana*), an insect with more than 200 hosts. Her Master’s project, funded by a grant from the Legislative-Citizen Commission for Minnesota Resources, has just started. It involves assessing the effect of host type (esp. black ash vs green ash) on cold tolerance of emerald ash borer (EAB; *Agrilus planipennis*). Of the state’s nearly 1 billion ash trees, most are black ash in northern Minnesota.

Anthony (Tony) Hanson is a second-year Master’s student. Anthony earned his Bachelor’s degree from Concordia College (Moorhead, MN), next door to my hometown in Fargo, ND. Anthony is studying the cold tolerance of parasitoids that control EAB (*Oobius agrili*, *Spathius agrili*, and *Tetrastichus planipennis*). Anthony’s research was set back when, ironically, we could not find enough EAB larvae to sustain his parasitoid colonies (Uff Da!). Those problems are solved, and Anthony is cranking through his research. His work is funded by a second grant from the LCCMR. Anthony also continues a side project with **Dr. Bill Hutchison** to develop better models to predict the emergence of western bean cutworm. Apparently, sleep is optional for Anthony.

Amy Morey is a second-year PhD student and is co-advised with Bill Hutchison. Amy won a prestigious NSF-funded IGERT traineeship to study risk analysis for invasive species and genotypes. Amy is studying LBAM and its capacity to acclimate and adapt to cold. She is finding that cold hardiness in LBAM comes with a fitness cost (i.e., lower reproduction). She is also attempting to artificially select for cold tolerance to see how quickly LBAM populations might adapt. Amy’s results have important implications for the reliability of pest risk assessments over time. Amy can often be found sequestered with her critters and her undergraduate assistant, **Laurel Mosca**, in the biosecurity level-2 facility on campus.



Living on the edge (of a coiled copper-constantan thermocouple).

Clockwise from bottom: Amy Morey, Anthony Hanson, Lindsey Christianson, and Rob Venette.

Andrea Hefty most recently joined my program. She is a first-year PhD student and is co-advised with **Dr. Brian Aukema**. Andrea is also an IGERT trainee. She is still developing her thesis topic, but it may deal with risks posed by walnut twig beetle (*Pityophthorus juglandis*) and Thousand Canker Disease to eastern black walnut. TCD has killed thousands of walnuts in the western US and was recently found in Tennessee, Virginia, and Pennsylvania. Andrea spends much of her time in the Aukema lab, but has not yet acquired that distinctive Canadian accent.

Winter is almost here. Let our field season begin!

Rob Venette is an Adjunct Associate Professor and has been affiliated with the Department for 14 years.

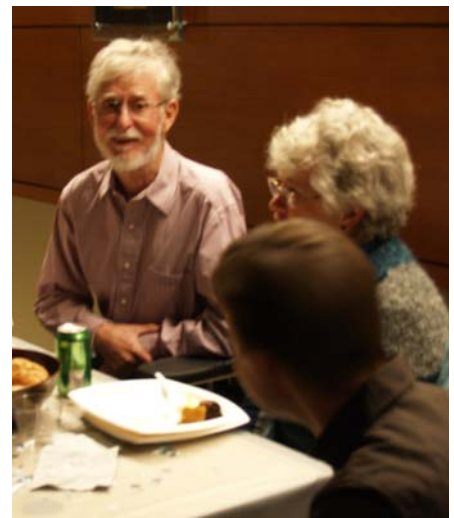
Entomology Photos



UNIVERSITY OF MINNESOTA
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Clockwise from Below: Malinovy Stream, Gamov Peninsula, Russia; Ted & Betty Radcliffe at the Holiday Party; Honeycomb on a tree; President Kaler's visit to the Bee Lab; Waterfall on Rio de la Plata, Los Cedros Reserve, Ecuador; A student working on her "gradient mesh" illustration.



Support the Next Generation of Entomologists!



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Guarantee the successful future of the Department of Entomology by including us in your estate plans.

The Department of Entomology provides world-leading research and education that inspires society to value the environmental contributions of insects and their relatives, and to use best management practices to protect our food, health, and environment. Our students and faculty are well positioned to provide practical and creative solutions to everyday problems not only in Minnesota but throughout the world. We believe in the need to build on this history.

You can help guarantee our future success by including the Department of Entomology in your estate plans. A gift in your estate leaves a legacy and at the same time may provide* tax savings. You may direct your gift to a specific area of research, students or to the Department's greatest needs (see web link below).

Many alumni and friends of the Department of Entomology have received great satisfaction from including the department in their charitable gift plans. We hope you will join them by including us in your future plans as well.

The generosity of alumni and friends has created several fellowships and scholarships including:

MGK Fellowship in Pest Management

Morris and Elaine Soffer Rockstein Graduate Fellowship (Fund #7616)

Sping & Ying-Ngoh Lin Graduate Fellowship (Fund #5257)

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For confidential inquiries concerning cash gifts, gifts of securities or planning an estate gift for the Department of Entomology, contact:

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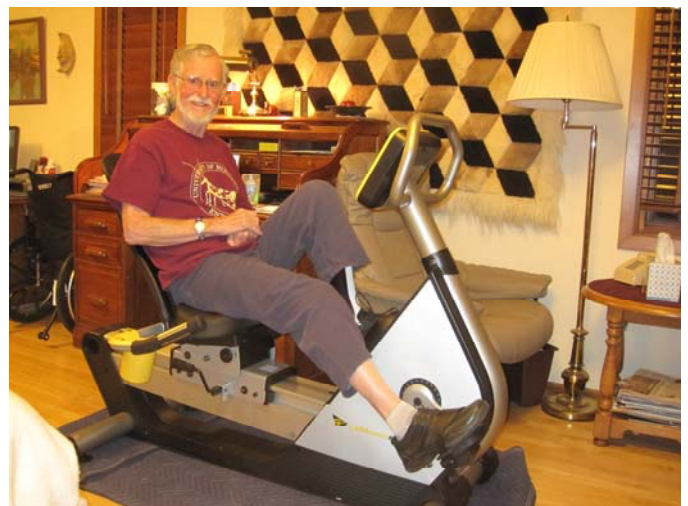
*Please consult with your own tax advisor or attorney.

We also invite you to consider gifts to generate momentum for the proposed "*Bee Research and Discovery Center.*"

For information, see www.BeeCenter.umn.edu or contact **Dr. Marla Spivak** (spiva001@umn.edu).

Fellowships and scholarships that anyone can contribute to are indicated by a **Fund #**. Please specify the Fellowship and Fund# with your check/gift. If you want to contribute to a Fellowship or Scholarship without a fund letter, contact Dr. Bill Hutchison. With just a few clicks of the mouse, gifts can now be made easily, by visiting the new on-line giving page at our department web site. Please see:

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Dr. Edward "Ted" Radcliffe

ENTOMOLOGY NEWSLETTER

FALL 2011



UNIVERSITY OF MINNESOTA
Driven to DiscoverSM

Produced for Alumni & Friends of the Department of Entomology, University of Minnesota.

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Acknowledgements

The editor and Public Relations Committee thank all the staff, students, faculty, and alumni who helped contribute to this newsletter. We particularly express our appreciation to Felicia Horan and Tomi Olayiwola for newsletter production and Alumni & Friends mailing list maintenance.

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**Aerial shot of St. Paul Campus showing
Hodson Hall in the upper left.**

Upcoming Meetings:

NCB-ESA Annual Meeting

June 3-6, 2012,
Lincoln, Nebraska

ESA National Meeting (& Alumni Mixer)

Nov. 11-14, 2012
Knoxville, TN

Meeting Websites, see:

<http://www.esancb.org/>
<http://www.entsoc.org/>